Log Event A

Borehole # 20-07-02

Borehole Information

Farm : B	**Tank :** B-107	**Site Number :** 299-E33-212
N-Coord : 45,257	**W-Coord :** 52,715	**TOC Elevation :** 654.25
Water Level, ft :	**Date Drilled :** 8/31/1973	

Casing Record

Type : Steel-welded	Thickness, in. : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 100	

Borehole Notes:

Borehole 20-07-02 was drilled in August 1973 to a depth of 100 ft and was completed with 6-in. casing. Data from the drilling log and Chamness and Merz (1993) were used to provide borehole construction information. These references do not indicate that the borehole casing was perforated or grouted. The casing thickness is presumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel tubing.

Equipment Information

Logging System : 2B	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 11/1997	**Calibration Reference :** GJO-HAN-20	**Logging Procedure :** MAC-VZCP 1.7.10-1

Logging Information

Log Run Number :	1	**Log Run Date :**	12/01/1998	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	100.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	50.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	2	**Log Run Date :**	12/02/1998	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	0.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	37.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	3	**Log Run Date :**	12/02/1998	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	36.0	**Counting Time, sec.:**	100	**L/R :** R	**Shield :** N
Finish Depth, ft. :	40.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

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Log Run Number :	4	**Log Run Date :**	12/02/1998	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	39.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	51.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Logging Operation Notes:

This borehole was logged in four log runs. The top of the borehole casing, which is the zero reference for the SGLS, is approximately even with the ground surface. The total logging depth achieved by the SGLS was 100.0 ft.

Excessive dead time was encountered from about 37 to 39 ft. As a result, log run three was logged in real time from 36 to 40 ft. The remainder of the borehole was logged in live time.

Analysis Information

Analyst : E. Larsen

Data Processing Reference : MAC-VZCP 1.7.9 Analysis Date : 12/02/1998

Analysis Notes :

The pre-survey and post-survey field verification for each logging run met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from the accepted calibration spectrum that most closely matched the field data were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

A casing correction factor for a 0.280-in.-thick steel casing was applied to the concentration data during the analysis process.

Shape factor analysis was applied to the SGLS data and provides insights into the distribution of Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A plot of the shape factor analysis results is included. The plot is used as an interpretive tool to help determine the radial distribution of man-made contaminants around the borehole.

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A plot of selected historical gross gamma logs from 1975 to 1994 is also included. The plot can be used to help identify any historical changes in gross gamma activity.

Results/Interpretations:

The man-made radionuclides Cs-137, Co-60, Eu-154, and Eu-152 were detected around this borehole. The Cs-137 contamination was measured nearly continuously from the ground surface to a depth of 24.5 ft. Isolated occurrences of Cs-137 were detected at 27 and 28 ft, from 64 to 75.5 ft, and at the bottom of the logged interval (100 ft). Large zones of continuous Cs-137 contamination were measured from 35.5 to 59.5 ft and 77 ft to the bottom of the logged interval.

Isolated occurrences and small zones of Co-60 contamination were detected between 44 and 54.5 ft.

The Eu-154 contamination was measured continuously from 42.5 to 58.5 ft. Isolated occurrences of Eu-154 were detected at 39, 41, and 79.5 ft.

Isolated occurrences of Eu-152 contamination were detected at 46, 50.5, and 57 ft.

Most of the U-238 concentrations are absent between 35.5 and 59 ft. The K-40 concentrations increase from 37 to 40 ft and remain elevated to the bottom of the logged interval. Relatively increased Th-232 concentrations were detected below about 40 ft.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Reports for tanks B-104 and B-107.